

**ABSTRACT**

A two-component mediator system is disclosed, wherein one component serves as a pro-oxidant and the other component serves as a pro-degradant and booster. When used in combination with a laccase, the two-component mediators enhance the bleaching of pulp. In addition, a composition comprising an oxidative enzyme, a pro-oxidant, and a pro-degradant, and a process for oxidizing a substrate that comprises treating the substrate with an oxidizing enzyme, a pro-oxidant, and a pro-degradant are disclosed. The pro-oxidant can be ascorbic acid, ascorbate, salicylic acid, salicylate, nicotinic acid, nicotinate, a hardwood black liquor, a softwood black liquor, ligno-organosolv, lignin sulfonate, or mixtures thereof. The pro-degradant can be urea, thiourea, sulfamic acid, sulfamide, guanidine, methylsulfonic acid, or mixtures thereof.

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